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# Mosquito and Arbovirus Activity

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**Abstract**
Mosquitoes are public health concerns as vectors of arthropod-borne viruses (arboviruses) and/or as nuisances to humans, so surveillance efforts are important to determine areas and times that may pose a risk to humans. The ISU Horticulture Research Station, Ames, Iowa, consistently yields mosquitoes that are positive for West Nile virus (WNV). Objectives were to continue to assess human risk by monitoring both mosquitoes and sentinel chickens, which serve as vertebrate hosts for arbovirus.

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# Mosquito and Arbovirus Activity

**RFR-A1145**

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## Introduction

Mosquitoes are public health concerns as vectors of arthropod-borne viruses (arboviruses) and/or as nuisances to humans, so surveillance efforts are important to determine areas and times that may pose a risk to humans. The ISU Horticulture Research Station, Ames, Iowa, consistently yields mosquitoes that are positive for West Nile virus (WNV). Objectives were to continue to assess human risk by monitoring both mosquitoes and sentinel chickens, which serve as vertebrate hosts for arbovirus.

## Materials and Methods

A New Jersey light trap (NJLT), which monitors mosquito species and abundance, was in operation daily May 23–October 7. A NJLT uses light as a mosquito attractant and functions from 6 p.m. to 8 a.m. every day through an automatic timer. Collection cups were brought to ISU, where mosquitoes were identified to species and counted for measures of abundance.

A gravid trap, which collects mosquitoes to be tested for arbovirus, operated May 31–September 30. A gravid trap uses organically infused water to specifically attract females ready to lay eggs, thus targeting those that have recently fed on blood and may have been exposed to arbovirus. Mosquitoes were stored at -80°C and processed on refrigerated tables to preserve virus. Mosquitoes of the same species and collection week were grouped into pools and sent to the University Hygienic Lab (UHL), Iowa City, Iowa, for arbovirus testing. Specimens of *Ae. triseriatus* were tested for LaCrosse virus. Specimens of *Culex* mosquitoes were tested for WNV and St. Louis encephalitis virus (SLEV). Specimens of *Cx. tarsalis* were additionally tested for Western equine encephalitis virus. Bloodfed mosquitoes, those visibly engorged with blood, were stored at -80°C; their blood meals can inhibit accuracy of arbovirus testing.

On June 15, eight chickens were delivered and housed in a coop. A baseline bleed of each chicken was done that week, and bleeds continued once a week until October 3. Blood samples were sent to the UHL for WNV testing.

## Results and Discussion

Mosquitoes were not abundant at the research station in 2011 (Table 1). This was true for most of Iowa due to drought. The most common mosquito was *Culiseta inornata*, the cool-weather mosquito that is common in spring and summer; it is neither a nuisance nor a vector. Second in abundance was the ubiquitous *Ae. vexans*, a nuisance mosquito, and it was followed by *Culex tarsalis* and *Cx. pipiens* group mosquitoes, which are the two species from which WNV is commonly isolated in Iowa. Their relative abundance at the research station is one reason that WNV-positive samples are consistently found there.

However, no mosquitoes or chicken blood samples tested positive for arbovirus in 2011. It is worth noting that 56 pools (2,621 individuals) of *Cx. pipiens* group mosquitoes were not tested due to budget restrictions (Table 2). Decisions regarding which pools to send were based on the date of collection. The typical WNV season runs from July through August, so pools within this time frame were given priority for testing.

In 2011, the gravid trap collected twelve times as many *Cx. pipiens* group mosquitoes as the NJLT collected of all species combined. This shows not only how effective the gravid trap is in targeting this vector species but also how common the species is at the research station. The abundance of this vector implies the importance of continued surveillance. Gravid traps are shown to be effective tools in arbovirus surveillance.

Because of low mosquito and arbovirus activity, the Horticulture Research Station was not of particular public health concern in 2011.

**Acknowledgements**

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**Table 1. Mosquito yields from New Jersey light trap in 2011.**

| Mosquito species | Female | Male | Total |
|---|---|---|---|
| *Aedes vexans* | 123 | 12 | 135 |
| *Ae.* unknown | 0 | 1 | 1 |
| *Anopheles punctipennis* | 2 | 0 | 2 |
| *An. quadrimaculatus* | 1 | 0 | 1 |
| *Coquillettidia perturbans* | 3 | 0 | 3 |
| *Culex pipiens* group | 44 | 9 | 53 |
| *Cx. tarsalis* | 49 | 53 | 102 |
| *Cx. territans* | 1 | 0 | 1 |
| *Culiseta* unknown | 0 | 1 | 1 |
| *Cs. inornata* | 189 | 9 | 198 |
| *Psorophora columbiae* | 1 | 0 | 1 |
| *Uranotaenia sapphirina* | 7 | 0 | 7 |

**Table 2. Arbovirus testing of gravid trap-collected mosquitoes in 2011.**[a]

| Mosquito species | Tested | Untested | Bloodfed | Total Collected |
|---|---|---|---|---|
| *Ae. triseriatus* | 4 (9) | 4 (14) | 0 | 8 (23) |
| *Cx. pipiens* group | 66 (3,601) | 56 (2,621) | 12 (41) | 134 (6,263) |
| *Cx. tarsalis* | 2 (3) | 1 (1) | 0 | 3 (4) |
| *Cx. territans* | 2 (4) | 1 (1) | 0 | 3 (5) |

[a]Mosquito yields displayed as pools (individuals).